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**Clean Copy of Page 4 of the Specification**

wherein a cage structure having at least 10 atoms is covalently bound to at least one of the first and second backbone.

In one aspect of the inventive subject matter first and second backbone are identical, preferably comprise a phenyl group, more preferably comprise a poly(arylene ether), and most preferably  
5 comprise a substituted resorcinol, a substituted tolane, or a substituted phenol as aromatic moiety. In other preferred aspects, the first and second reactive groups are non-identical and comprise an ethynyl moiety or a tetracyclone moiety, and the crosslinking reaction is a cycloaddition reaction.

In another aspect of the inventive subject matter the cage structure preferably comprises a substituted or unsubstituted adamantane, or substituted or unsubstituted diamantane, wherein the  
10 adamantane or diamantane may be incorporated into the backbone as a pendent group or such that the cage structure has a tetrahedral or polyhedral configuration.

Various objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of preferred embodiments of the invention, along with the accompanying drawings in which like numerals represent like components.

#### **Brief Description of The Drawings**

Figure 1 is a synthetic scheme to produce a low molecular weight polymer with pendent cage structures according to the inventive subject matter.

Figure 2 is a synthetic scheme to produce another low molecular weight polymer with  
20 pendent cage structures according to the inventive subject matter.

Figures 3A-B are structures of various polymers according to the inventive subject matter.

Figures 4A-B are synthetic schemes to produce various thermosetting monomers according to the inventive subject matter.

Figures 5A-B are synthetic schemes to produce an end-capping molecule with pendent cage  
25 structures according to the inventive subject matter.